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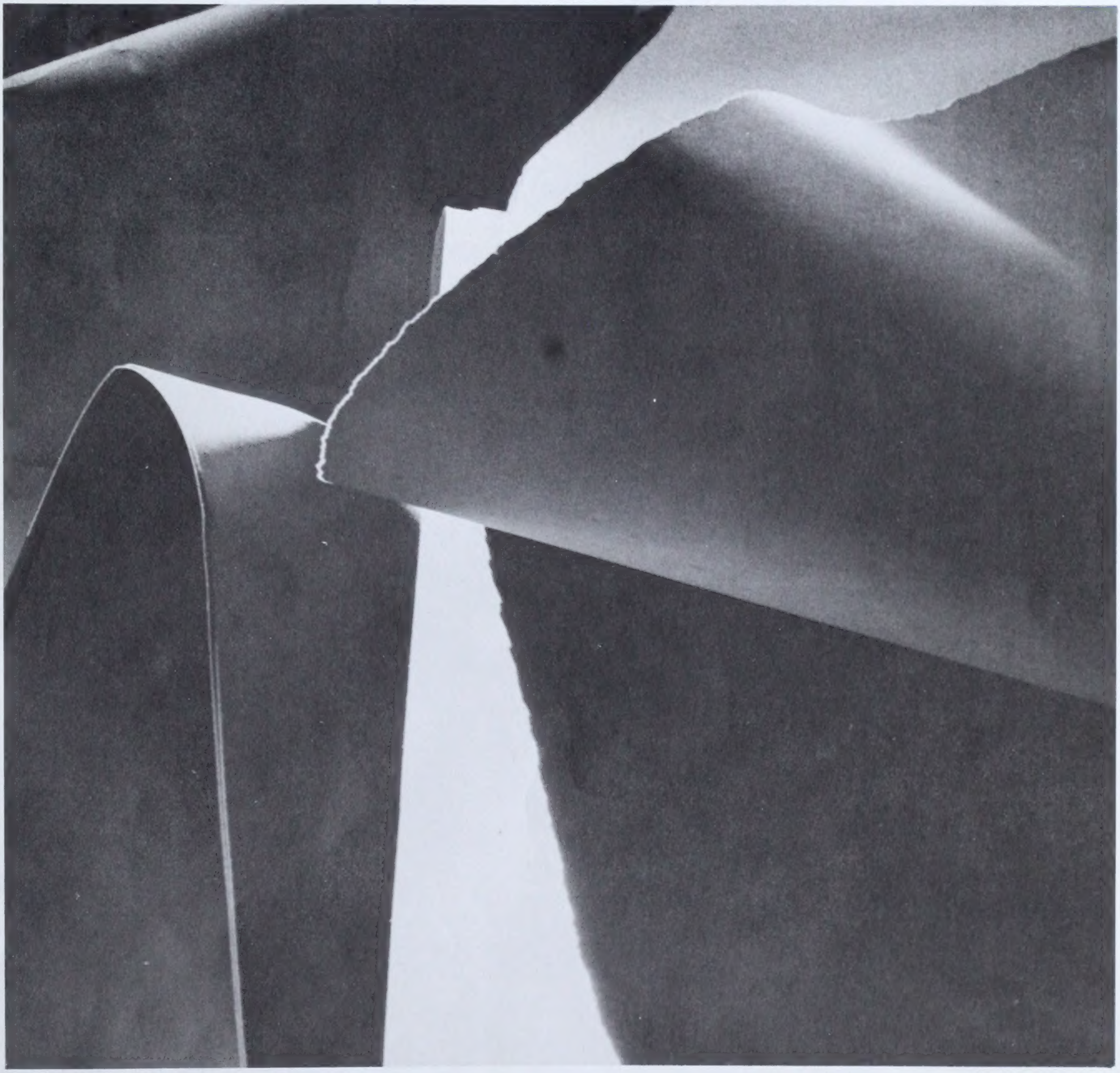
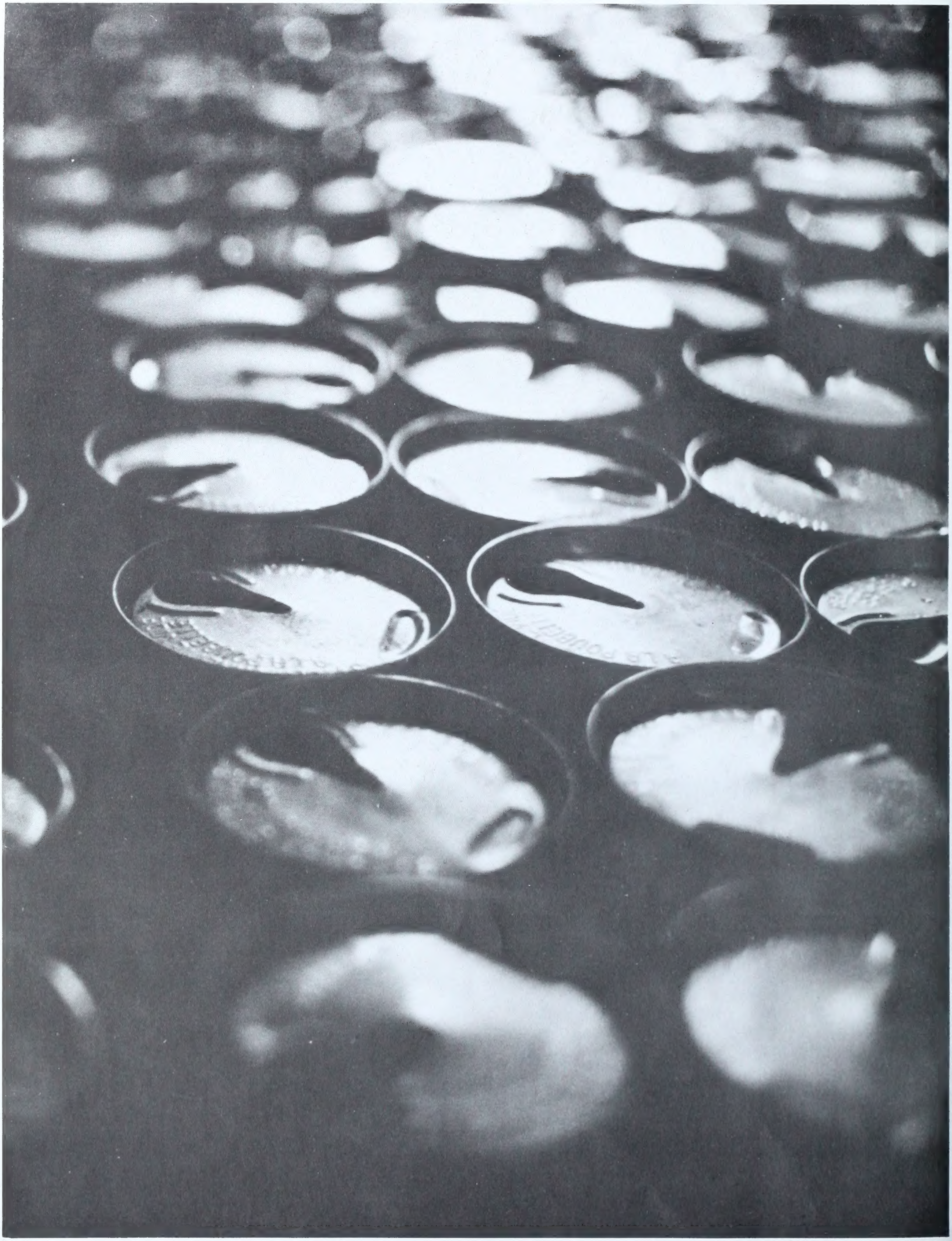


Recycling: Paper, Glass, Oil, Metal



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Contents

This issue of *Environment Views* (previously *Environment News*) examines the status of recycling in Alberta, particularly the recycling of materials that most households accumulate: glass jars, tin cans, beverage containers, old newspapers. It also covers the success of industries which manufacture goods from otherwise-wasted materials, and recalls one industry's failure to convince the public that quality products could be made from "garbage."

All stories that do not carry credits were written by freelance editor Kathy Kennedy, with the exception of the story on beverage containers, which was written by Ms Kennedy and freelance writer Robert Bott.

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Introduction Kathy Kennedy

Recycling

The good side of garbage: not rubbish, but "resources out of place."

Recycling – is it a fad that flowered in the 60s, only to eventually languish in public apathy? Or is it a way of life we must accept as resources dwindle and our garbage grows into an increasingly costly and troublesome burden?

A look at the status of recycling in Alberta shows that it is both, and more. It has grown into a number of healthy industries; it has removed unsightly litter from our roadsides; and it has funded thousands of projects by community groups.

As environmental scientist Dr Karl Schulze notes, "there is no need to argue whether we should or should not recycle. Recycling is actually all we can do on this finite planet; whether we dump it, burn it, or pump it down the drain, nothing ever gets lost."

But this examination of recycling looks at the alternatives to dumping, burning or pumping down the drain. It looks at our attitudes, our successes and our failures in taking our garbage and transforming it into useable products.

There are a number of obstacles to recycling, economic and psychological. Recycling processes, and transportation of materials to plants for recycling, are sometimes prohibitively expensive. People still tend to see recycling industries as low-status garbage dealers, and shy away from handling the glass, metal and paper waste they generate in their own homes.

Recycling must be considered in a total context: the first objective is to make less garbage. This involves demanding less packaging of products, putting food wastes into a compost heap for your garden, reusing old containers, and repairing, rather than discarding, old appliances and furniture.

But there's still a vital role for recycling to play, in breaking down the things we can't reuse, or can reuse only in limited quantities – newspaper, odd-sized glass jars, tin cans, crankcase oil, old car bodies – and incorporating the old material into new products.

Before looking at how products can be recycled, it is necessary to consider the question: Why recycle? What gains are to be made by separating garbage into its various components and making them available for recycling?

First of all, there are energy savings. Even in a province as resource-rich as Alberta, the energy supplies are limited, and the costs involved in extracting gas, oil and coal are rapidly increasing.

It takes three to four times as much energy to make steel from iron ore as it does from scrap steel. It takes twice as much energy to make glass from sand, soda ash and limestone as it does from old glass. It takes roughly half as much energy to make paper from old paper as from trees, and about one-twentieth as much energy to make aluminum from recycled aluminum as from aluminum ore!

Not only does it save energy to use raw materials that have already been processed, but some of the resulting products cause even greater energy savings. Cellulose fibre insulation, for example, made from recycled newsprint, is one of the most effective building insulations on the market.

In addition, some environmentalists have suggested burning garbage as a supplementary fuel after removing valuable non-combustibles, like glass and certain metals.

Energy isn't the only resource conserved by recycling. Minerals and forests are also conserved. It is estimated that 17 trees are saved for future use by every ton (0.9 tonne) of paper recycled; this adds up to 765,000 trees saved last year from the paper recycled by Alberta's two major paper dealers.

Another major reason for recycling is to lessen the solid waste – called the third pollution, after water and air – generated by our society, which costs millions of dollars annually to handle and consumes an increasing acreage in landfill sites.

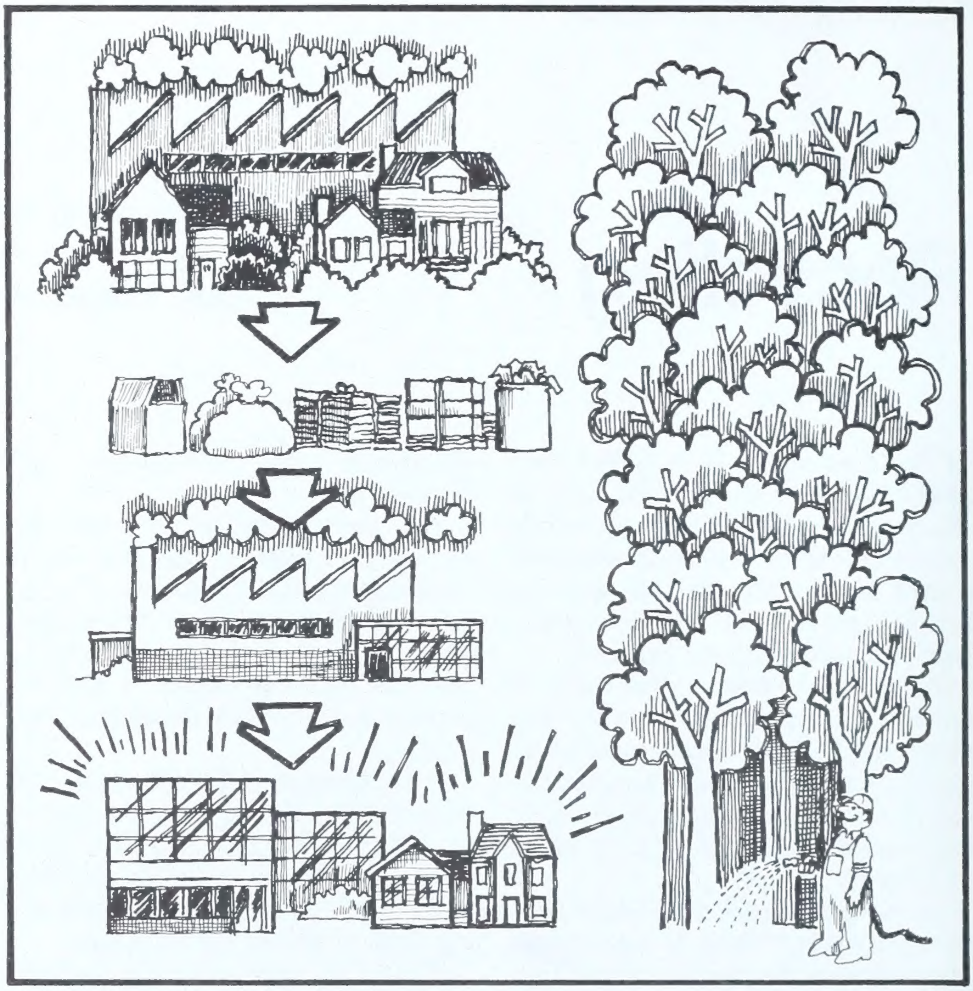
Landfilling, the most common method of waste disposal in Alberta, is the process of spreading wastes in layers, separated by layers of soil, and packing it all down. Although landfilling is unquestionably a better way of handling solid wastes than in open dumps, there are problems associated with it.

According to a waste resources study written for the University of Alberta's interdisciplinary committee for environment quality, landfilling results in the settling of earth, restricting use of the land after landfilling is completed. Hazardous methane gas can accumulate during decomposition of wastes, and groundwater pollution may occur from nitrates, sulphates, lead and other trace metals as well as certain organic compounds in the garbage.

While the costs of collecting, hauling and processing (in Edmonton, garbage is ground in transfer stations before being taken to landfill sites) are increasing, other costs, such as the lost potential of valuable components within the buried garbage, should also be considered, said the study.

According to Environment Canada's

A ton of waste paper, gathered from homes and businesses, not only preserves 17 trees for future use but gives industries an already-processed material they can transform, with relatively little energy, into building products for new homes and offices.



solid waste management branch, every Canadian discards an average of about four pounds (1.8 kg) of garbage a day, or 1,500 pounds (675 kg) a year. About half of those four pounds (1.8 kg) are discarded at home, the rest at work, school and other places.

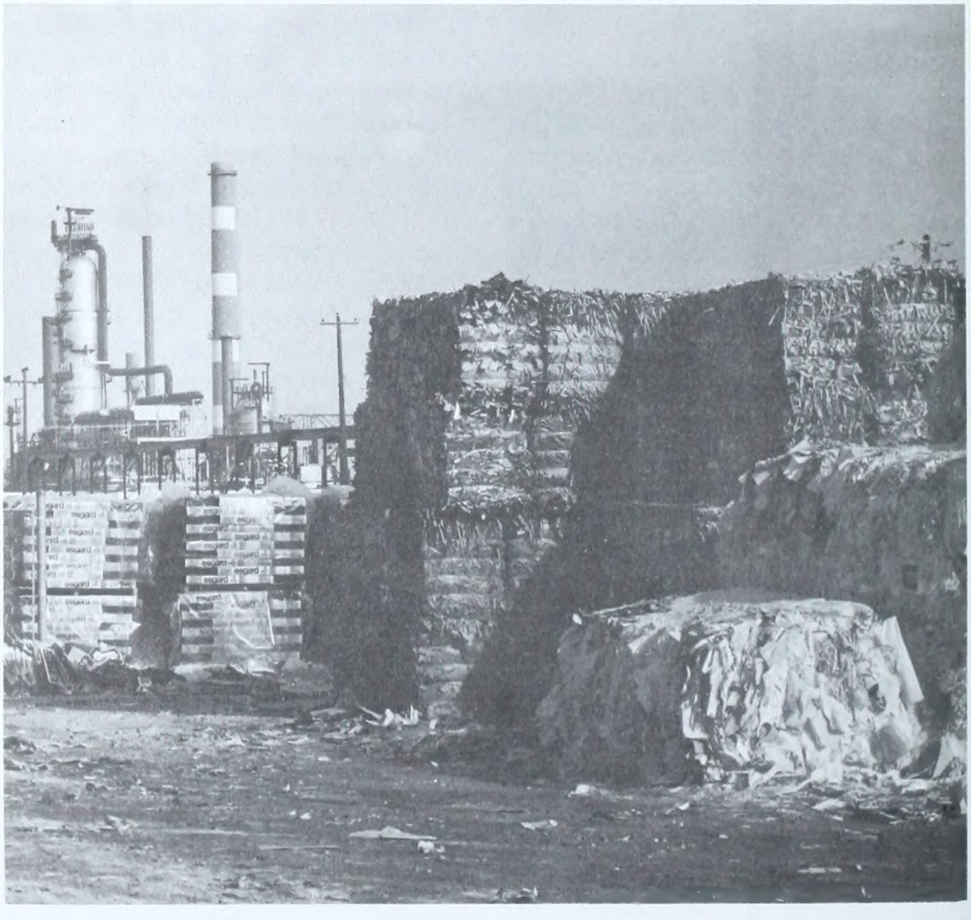
Nearly 38 per cent of the waste is containers and packaging: this includes about 11 per cent glass containers, seven per cent steel cans and 15 per cent paper. About 30 per cent of the waste is classified as non-durable goods, such as paper not used in packaging, and clothing. About 21 per cent is food waste, five per cent yard waste and six per cent miscellaneous inorganic waste.

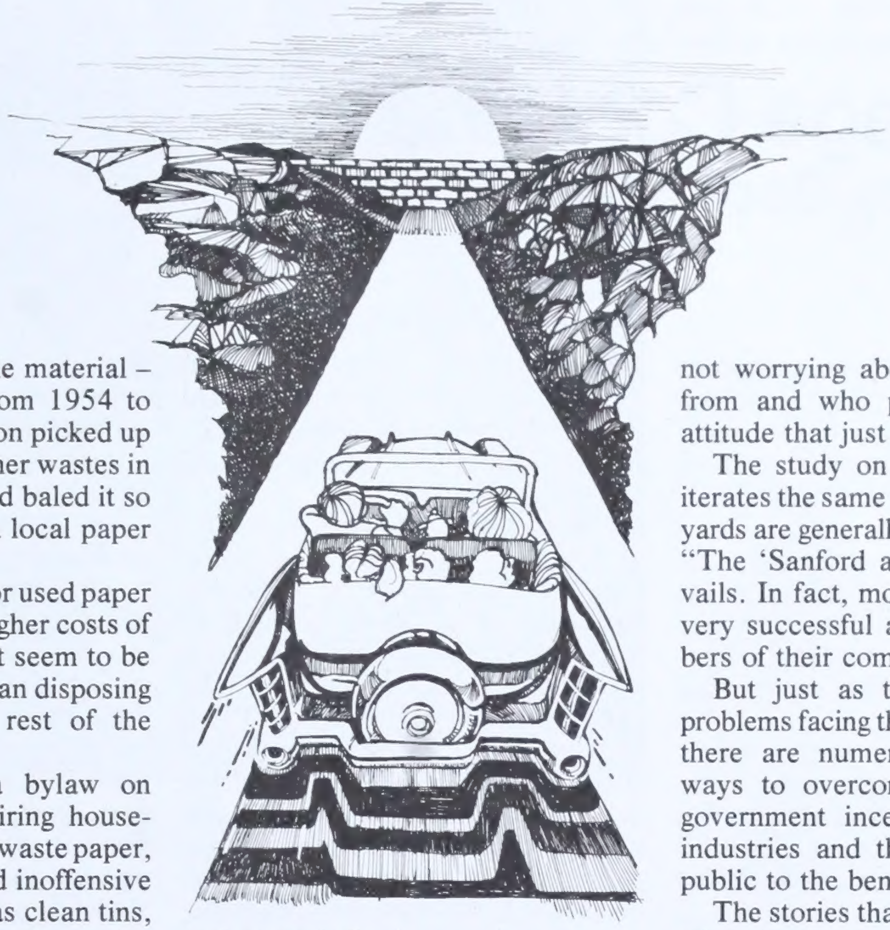
Waste, suggests the university's study, should not be considered garbage as much as a "resource out of place." The recoverable part of waste can be handled, basically, in two ways: separated at the source by the householder or business, which would then channel it to recycling groups, or separated after collection by municipalities, which would then sell the various valuable components.

From this investigation of recycling in Alberta, it seems that a combination of the two would be most feasible. But the householder, business or municipal government generally needs some economic motivation. At the least they need to be ensured that their efforts will be rewarded by decreased taxation (in garbage disposal costs).

Even recycling projects that count on the ecological concern of citizens, rather than monetary return to individuals, are unsuccessful if organizers can't be ensured of markets, or buyers, for the material they collect.

One historic problem of attempts to recycle has been fluctuations in the





markets for the recyclable material – paper, metals, glass. From 1954 to 1962 the city of Edmonton picked up paper separately from other wastes in its garbage collection, and baled it so it could be recycled by a local paper salvage company.

But when the market for used paper became depressed, the higher costs of separate handling did not seem to be justified, and the city began disposing of the paper with the rest of the garbage.

So while there is a bylaw on Edmonton's books requiring householders to tie in bundles "waste paper, newsprint, cardboard and inoffensive household refuse" such as clean tins, glass and other food containers, the bylaw is not now enforced.

Gay Broderick, waste paper consultant for Paperecycle of Alberta, noted in an interview that four or five years ago "we had to dump paper for landfill."

At the present time, with used paper in great demand for the production of building products like wallboard, shingles and insulation, the salvage companies can't get enough. "But there are no guarantees.

Between 1972 and 1974, the Calgary Eco-Centre ran Project Recycle, an ambitious plan to collect and recycle old paper, metals and glass. But by 1974 it became apparent the sagging price of paper wouldn't support the project, and it was dropped.

Similarly, says a report prepared for the Alberta government on used metal recycling, the scrap metal industry is prone to fluctuations. "In the ferrous (iron-based metals) context, the markets fluctuate with the building economy. As such, there can be no real controls."

The University of Alberta's waste resources study outlines other constraints discouraging recycling, including freight rate structures, which mean secondary materials cost more to ship than virgin materials, and tax structures which allow tax concessions to virgin material producers but not secondary material producers.

Another big problem is that society chooses to use disposable materials, in spite of the fact that they can't be recycled, and hesitates to accept products made from secondary materials.

"We're trying to rid ourselves of the image of the dirty scrap dealer," said Broderick. "We live in a throw-away society in which new is good, old is bad."

When discussing why the University of Alberta's paper recycling program has only 30 per cent participation by university staff, Werner Larsen said some people feel they're "above" separating recyclable paper from non-recyclable.

"People are used to 'having' and not worrying about where it comes from and who pays for it. It's an attitude that just must change."

The study on metal recycling reiterates the same theme, saying scrap-yards are generally held in low esteem. "The 'Sanford and Son' image prevails. In fact, most scrap dealers are very successful and respected members of their communities."

But just as there are numerous problems facing the future of recycling, there are numerous suggestions of ways to overcome them, including government incentives to recycling industries and the education of the public to the benefits of recycling.

The stories that follow tell not only what business and government – Canadian Pacific Railways, the soft drink industry, the University of Alberta, the environment department – are doing to help conserve for the future, but what you as an individual can do.

Newspapers, tin cans and food jars need not go into the garbage can. Old cars need not sit in rusty heaps outside homes or on roadsides. During an oil change, dirty oil need not be left on the ground.

"I personally see society travelling down a highway in a vehicle with many hands on the steering wheel and many feet on the accelerator," says Dennis Wighton of the university's interdisciplinary committee on environmental quality. "I see a wall, and the accelerator being pushed down at a growing speed."

But the ethic of a conserver society – do more with less – "takes the feet off the accelerator and allows us to slow down the vehicle" so we can see where we're going, and if we choose, take a different route. ☐

Millions of pop cans and wine, liquor and soft drink bottles are recycled each year, but improvements can still be made in the collection network.

Beverage Containers

The Money-Back System

People who walk along Alberta's roadsides may have noticed a change over the past six years – a marked decline in the number of bottles and cans littering up the landscape.

It's meant more than clean scenery to the farmers and highway crews who've had to spend less time disentangling mowing machinery from glass and metal as they've trimmed the road verges.

The reason for the change is that a generation of teenagers, assisted by others in need of quick pocket money, has grown up seeing a profit in each pop can and whiskey bottle found lying around.

Behind the army of bottle and can collectors is a network of about 170 privately-owned depots across Alberta, with an average of about two employees each, which pay refunds ranging from two cents for a pop can up to 30 cents for a 1.5-litre giant pop bottle.

It all began in 1972, when Alberta's Beverage Container Act came into effect, declaring that a refund must be paid on any soft drink container returned to a retailer selling that product.

Amendments to the act were later passed, adding liquor and wine bottles to the deposit-refund system and allowing for the establishment of universal collection depots.

Actually, the act obligated the soft drink manufacturers and the Alberta Liquor Control Board (ALCB) to pick up their containers from the depots, reimburse the depot operators for refunds paid to consumers and pay the operators an additional handling charge of two cents a container.

Breweries and bottlers eagerly picked up the refillable bottles (it costs about 16 cents to replace a 10-ounce pop bottle, compared with a deposit and collection cost of only about seven cents).

But what about the cans, and liquor or wine bottles which could not be refilled? They had to be destroyed somehow, or profiteers could keep digging them out of the dump and bringing them back for deposits over and over again.

Mere destruction would have been enough, but something far better was devised: a system of recycling the metal and glass, in the process providing jobs for many small truckers and about 50 full-time workers, 60 per cent of whom are mentally retarded.

The soft drink companies contracted Contain-A-Way Ltd of Calgary, and the ALCB contracted an associate company, LB Recycling Ltd, to pick up their containers, process them and sell the raw material. The companies, which have common staff and work out of common premises, were to pay the depots and be reimbursed, plus a handling fee, from the soft drink companies and ALCB.

Once the cans and bottles are collected, depot operators place them in cardboard containers provided by Contain-A-Way (the name by which we will refer to the two companies). In another example of recycling, the cardboard cartons are folded and sent back to the depots after use, making an average of 14 round trips before wearing out.

About 100 small truckers around the province, who welcome getting a "backload" when they normally would be running empty, haul the cans and bottles to the three Contain-A-Way collection centres in Calgary, Edmonton and Lethbridge.

Contain-A-Way staff, many of whom are mentally retarded, count the containers, separating colored glass from clear glass, and send the bottles to a machine for smashing, the cans into another machine to be crushed.

The metal from the cans is baled at local scrapyards, like Scrap City in Calgary, and taken to the Stelco mill in Edmonton or Western Canada Steel in Calgary where it is used in making low-grade steel. Most of the glass is sold to Canasphere Ltd of Moose Jaw, Sask, which uses it to make reflective spheres for highway paint, and the rest goes to Domglas Ltd in Redcliff, Alta, near Medicine Hat, which uses it to make new glass.

Prices paid for metal from the cans and glass from the bottles are quite low, and don't begin to cover the cost of collecting, transporting and handling, says Ken Taylor, vice-president of Agra Industries Ltd of Saskatoon, which operates Contain-A-Way. The loss is made up by the soft drink bottlers and the ALCB.

Don Hall, environmental administration officer for the ALCB, notes that, for the year ended March 31, 1977, the sale of wine and liquor bottle glass brought in about $106,000 or 3.5 cents per dozen bottles, while the total cost of the bottle return program was more than $1.3 million.

"It'd be cheaper to throw away the bottles," said Hall, "but we recycle them from an environmental point of view."

The ALCB does not pass the bottle return costs directly on to the consumer, he said, acknowledging that the general citizenry eventually pays because the ALCB has fewer profits to send to the provincial treasury.

For the fiscal year ending in March, 1977, more than 81 per cent of the wine and liquor bottles sold across the province in ALCB outlets – about 37 million out of 45 million bottles – were returned to universal depots.

Taylor said the proportion of pop cans and bottles returned was also "amazingly high," ranging from 60 per cent on cans to over 90 per cent on refillable pop bottles. The rate is lower on cans because they appeal to the "convenience" market – hotel patrons, high-rise dwellers, people in remote areas – and more frequently end up in the garbage.

Taylor noted that Contain-A-Way handles about 8,000 tons (7,200 tonnes) of cans per year, or about 200 million out of 300 million sold in the province annually.

At the Contain-A-Way centre in northeast Calgary, the work is carried in a clean and efficient manner. General Manager Les Hibbs is glad to be part of recycling and controlling litter, and he also likes being able to help the mentally retarded who make up 60 per cent of his work force.

He said that the recycling operation has many side benefits. "People are out there walking the ditches to collect bottles and cans, and that saves thousands of dollars for the department of highways and the farmers who mow the ditches.

"Our depots are also great free enterprises, and they're always promoting bottle drives. The Boy Scouts, community groups, high school bands, hockey teams, they're all part of it. They're making money, cleaning up the environment and not running to the government for handouts."

But everyone is not convinced that the depot system is running as well as it should be. A report by Woods, Gordon & Co, management consultants, for the environment department's waste management branch last July, suggested that a comprehensive review of the universal container depot system was necessary, particularly with regard to the status of beer bottles within the system.

The viability of many depots depends on the beer bottle trade, yet, because the handling of beer bottles is not included under the act, a "climate of insecurity" is created, which does not encourage depot operators to invest in the upgrading of their operations.

"As a result," said the report, "the effectiveness of the universal depot system does not appear to be improving, and, in fact, may be declining," as shown by the fact that, during 1976, while the overall ratio of beverage containers sold to beverage containers returned held steady at 77 per cent, the ratio actually decreased for pop cans.

In addition, an increasing percentage of pop bottles was being returned to retail stores in preference to universal depots.

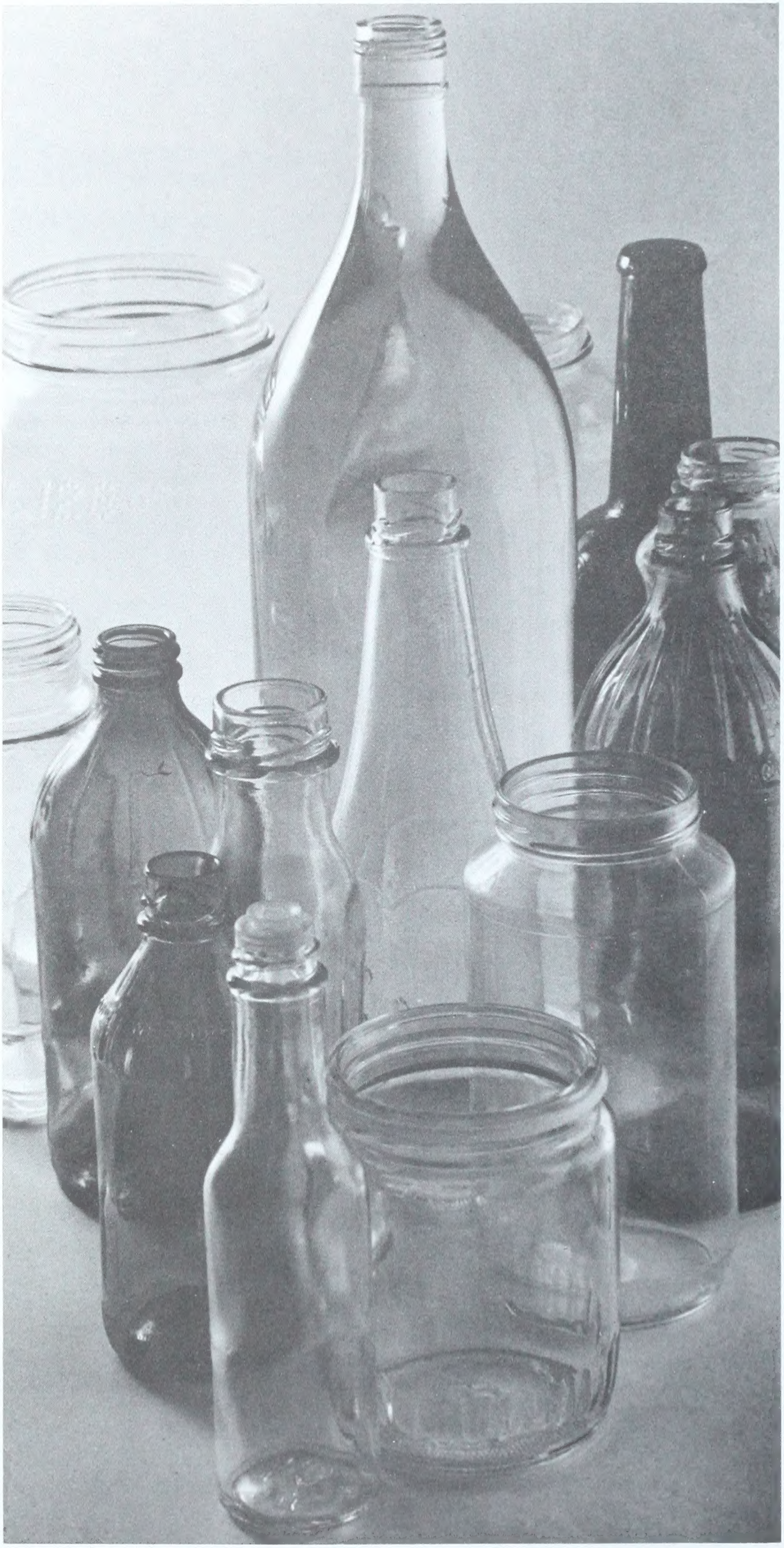
At the same time, said the report, the cost of the Beverage Container Act to Albertans was $6.3 million in 1976, up 31 per cent from the previous year.

Last fall the Alberta government passed a new Beverage Container Act, after discovering, according to an environment department spokesman, that its planned amendments to the old act resulted in "more changes than there was act."

The act sets out principles to be followed in the handling of beverage containers, but specifies – regulations determining, among other things, what kinds of containers are to be included under the act – have yet to be drawn up in their final form.

The act was originally meant partly as an anti-litter measure, said the spokesman, which explains why containers like individual juice cans weren't included. "Juice was something bought in 48-ounce cans at the supermarket . . . since then (small) juice cans have taken over a larger share of the market."

Whether juice cans, beer bottles – which can also be returned to brewery outlets – or other types of containers will be included under the new act is still to be determined. □



Glass Recycling

Although an impressive number of pop, wine and liquor bottles is recycled in Alberta, there still is significant untapped potential left behind in the garbage can: the glass jar.

About 165 pounds (74 kg) of glass are thrown away for each Albertan every year, including containers for products like peanut butter, mayonnaise, salad oil, fruit juice and pickles.

Rod Parker, president of Canasphere Alberta Ltd, which receives about 90 per cent of Alberta's beverage-container glass from LB Recycling and Contain-A-Way, says his company could use the glass from jars.

Canasphere's parent company in Moose Jaw, Sask, Canasphere Industries Ltd, makes tiny spheres for reflective highway paint from about 1.5 million to two million pounds (675,000 to 900,000 kg) monthly of clear waste glass.

"We could use twice that much," said Parker, adding that the company hopes to get a long-term supply contract from the Alberta Liquor Control Board so it can build another glass sphere manufacturing plant in Calgary.

Canasphere gets at least half a dozen phone calls a month from conservation and other community groups seeking a market for waste glass, he continued, and pays from $14.50 to $30 a ton (907 kg) depending on quality, type, and distance to be shipped.

Canasphere Industries, which has a staff of 27 and a 25,000-square-foot (2,250 square metres) plant, sells the glass spheres to provincial highway departments, which incorporate it into the reflective paint for lines on highways.

Domglas Ltd of Redcliff, Alta, the

only glass manufacturer in Alberta, takes about 5.5 million used bottles a year to crush into "cullet" and melt down in the production of new glass.

Although some amber and green glass is used, most of it is clear, and Manager W J Selhorn says food jars, if they could be collected and cleaned, would be useful to that company as well.

Selhorn said a certain amount of cullet was necessary to aid in the melting process; otherwise, the glass would have to be made entirely from raw materials such as silica sand, limerock and soda ash. Some cullet is generated by the glass manufacturer himself, in the form of waste left over from the manufacturing process.

Domglas, which manufactures beer, soft drink, liquor and wine bottles as well as food jars, could also use more waste glass, he added.

So what is holding up efforts to collect and recycle glass jars? One major problem is getting the householder to separate, rinse and make available the glass, without the motivation of a deposit. The Save Tomorrow Oppose Pollution (STOP) organization in Edmonton has set up a depot to take glass jars, among other things, in order to help ascertain the willingness of people to recycle glass.

The most economic container, notes Rob Pritchard of the provincial environment department's solid waste management branch, is "a refillable container that makes nine trips."

If the size and shape of glass jars could be standardized – if, for example, all catsup manufacturers would use two uniform jar sizes and shapes – a collection system could be devised to return the jars to catsup manufacturers for refilling.

> **One major problem is getting the householder to separate,rinse and make available the glass without the motivation of a deposit**

But there is no legislation in Canada requiring the standardization of containers, and food companies seem to prefer their own styles of jars for easy identification of particular brands.

One industry in Alberta that has voluntarily adopted standardized containers is the beer industry. This means any beer company can use any other beer company's bottles; they don't have to be sorted after delivery to the bottle depot.

In 1971, Carling O'Keefe Breweries of Canada Ltd tried to innovate by opting for a "keg" bottle for its Heidelberg brand, rather than the traditional stubby bottle.

"The bottle contained the same amount of liquid – 12 ounces (360 ml)," recalls Armond Fitzgerald of Calgary, Carling O'Keefe's provincial general manager.

"It was a glamorous package and the brand was most successful."

But the lack of standardization created some problems. Instead of any brewer in the province being able to use any empty, Heidelberg empties had to be returned only to Carling O'Keefe.

"There was some objection about the lack of standardized container," said Fitzgerald. "Most of the objections came from government and our competition."

The keg bottle was eventually withdrawn and Carling returned to the standard beer bottle, although, said Fitzgerald, sales were adversely affected when the distinctive bottle was withdrawn.

This episode, and the handling of beer bottles generally, demonstrates several things about standardization: first, how standardization permits more efficient handling of containers; second, how some companies prefer their own distinctive image and claim it results in better sales; and third, how an industry can apply pressure on its members to conform to widely-accepted practices.

The use of waste glass for new containers, or beads for reflective paint, forms only part of the potential for recycling old glass. Experiments in Canada and the United States have brought to light many more uses.

One promising development is a product called glasphalt – a road paving material from crushed glass, which is reported to create a tough, smooth, weather-resistant and skid-resistant road surface. Municipalities could separate glass from their own solid waste stockpiles to produce it.

The United States Bureau of Mines has developed a building brick from 80 per cent waste glass, with a 20 per cent clay binder, which stands up to building code requirements in North America. The bureau has also developed a glass wool insulation material from up to 65 per cent waste glass.

And a light-weight, aerated concrete, using glass in the same way as glasphalt, has been developed at Stanford University in California, under a grant from the US Bureau of Mines. ☐

Bernie Goedhart

Life in a Bottle Depot
A Family Affair

It's a sunny, but cold Saturday afternoon.

A line of about 15 cars creeps its way in a U-shape around the old millwork shop that houses The Bottle Bin, a bottle recycling depot on Edmonton's south side. Inside the high-ceilinged building there's a constant deafening clatter as bottles are sorted into appropriate bins and cases. Occasionally the clatter is interrupted by a crash, signalling some breakage.

A radio blares the Top-40 tunes; there's a lot of goodnatured bantering among the youths sorting bottles and loading crates. The action is fast and everyone appears busy.

"It's a slow day," says 18-year-old Derek Posch who, with his father, Joe, operates the depot.

At this time of year, Saturday is the busiest day at bottle depots in the city, but the weather has a lot to do with the volume of customers. The Bottle Bin is one of the largest, doing "the second-most volume" of the 171 bottle depots in Alberta, says Derek.

He and his father are relative newcomers to the business. Mr Posch was a dental technician when he decided a change was in order and bought the depot about six months ago.

"I started here right out of high school . . . and work 64 hours a week," Derek said. During the week, the depot employs two people in addition to him and his father. Saturdays there are about 14 employees, including Derek's mother, Adeline, his 14-year-old sister Becky, and his 12-year-old brother Cameron. The others are students, ranging in age from about 14 to 17 years.

Hiring young students is a practice common to local bottle depots. Gordon MacPherson, the outspoken 60-year-old operator of Univer Bottle Depot, has about seven youngsters working for him on a Saturday.

Bottle depots are run by private operators, and as such differ to some degree even though the prices paid to customers are standard. At The Bottle Bin, cars approach two windows, customers unload their bottles at the windows, and sorting is done by employees inside the building.

At Univer, where the building and lot are smaller, the sorting is done by the customers themselves. "If we had to do the sorting, I'd never make any money," says Gordon, as he marshalls people – employees and customers alike – into efficiency during the Saturday crush.

He provides customers with appropriate crates – called "shells" – for pop bottles, cardboard trays for cans, and liquor board recycling cartons for liquor bottles. The customer can then use a dolly to load his empties and roll it up to the cashier's window – provided it's his turn.

Compared to a depot where customers simply pull up to a window, drop off their bottles and wait for someone to give them their money, the operation at Univer – on a Saturday at least – seems much more frenzied. Cars pull into the lot two abreast; the lot holds about four cars at a time – the others line up into the alley and the street. People try to approach the window with their bottles in bags or cardboard boxes and are humorously but firmly told by Gordon to heed the signs and sort their bottles into the appropriate containers.

A man removing a case of beer bottles from his car drops the case and three or four bottles shatter. "There goes some money," comments a bystander. "Just push them out of the way of the tires," Gordon tells the man who dropped the bottles. "One of my workers will clean it up." Time is of the essence.

He turns to tell someone else to fill up a beer bottle case, then warns two young men loading cases of beer bottles onto a dolly that they should pull the dolly to the window, not push it. Otherwise the bottles will fall off the front of the dolly.

"So many people say 'Oh, I didn't know it would fall.' I tell them: 'Watch a horse sometime. He never pushes anything.' "

Inside, things are equally busy. Cases of liquor bottles are stacked to the ceiling. Shells filled with pop bottles are sent whizzing down roller tracks from the cashier window, and an elderly-looking man methodically removes the shells and stacks them. He is a transient, one of several Gordon hires periodically. "Nobody gives them a chance," he explains matter-of-factly.

Dale Gillis, a 16-year-old who has worked for Gordon for two years, said not all days are as lively as Saturday. But asked if he ever gets bored on slow days, the employee said no. "We don't get the chance to get bored," another said. Gordon, who scoffs at laziness in any form, nodded.

Even Leonard Hintz, who "stays right on the premises" and acts as night watchman, doesn't lack for things to do, Gordon said. "If nothing else, there are always mice to catch."

Leonard grins: "One night I got 13." The mice apparently scurry around overhead; since the walls are cement, they opt for the warmth above ceiling and occasionally come down through pipes.

Asked if any of them ever made

their way into the bottles, Gordon guffawed. "Hell no. They'd never drink that stuff."

Not that the idea of finding a mouse in a bottle is totally far-fetched. Some of the bottles returned to depots can be brought in fairly disgusting condition.

Lorna Luchak, 31, who with her husband Wayne operates Bonaventure Bottle Depot, grimaces when she talks about some of the things that turn up in bottles brought to the depot – dead mice included.

As with any job, running a bottle depot has its drawbacks. The Luchaks entered the business in April, 1977, and have found that the hours are long. "This is about the slowest time of the year," said Wayne. "Summer holidays are busy. January is busy because people are cashing in after the festive season. And in the spring, with spring cleanup (when people clear out their basements) a guy can go squirrelly here. But February and about all of March are slow."

Customers can be troublesome. There are always those who quibble over the amount being paid them, and sometimes people get into arguments over who was first in line. But "when you're working for someone else you can run into people you don't like, too," says Lorna. And in such cases you may be forced to work alongside those people everyday, she said, indicating that at the bottle depot troublesome customers are not really a constant burden because "you don't see them for long enough."

Besides, there are just as many pleasant customers. "We get one guy who's on a pension and he comes in with bottles he collects to supplement his pension," said Wayne. "One guy comes on a bike. We call him the Sunshine Man (because he's friendly). If we're busy, he'll park his bicycle and help people unload bottles. I guess he's about 60 years old."

Some people bring in bottles worth quite a bit. Derek recalled a man who, on a Wednesday, brought in 144 of the 1.5-litre bottles which carry a 30-cent deposit each. The largest single load he recalled, not counting those in bottle drives, was a person who brought $90 worth. "And I had a guy bring 96 cases of beer once."

But there are also those who come in with just a few bottles – children who find a bottle or two along the road, or people who just want to get rid of their empties, not necessarily to make money. "Some guys come in with 60 cents worth of bottles," said Wayne. "That doesn't even pay the gas (it takes to drive to the depot)."

Lorna added there are also customers who give tips. "Sometimes they have the tip ready and it's more than what they got for their bottles. One man gave us $10 for the four of us at Christmas, and his bottles only came to $2."

Wayne compiled figures for a six-month period from June 1 to Dec. 1, 1977, which show that Bonaventure handled: 10,824 cases of 10-oz pop bottles, 24 bottles to a case; 14,183 cases of 26-oz pop, 12 bottles per case; 3,759 cases of 40-oz bottles, eight per case. In the category of 1.5-litre bottles, there were 6,190 cases of Coke, six bottles per case; 5,539 cases of Canada Dry and Pepsi, eight per case. Bonaventure also handled 44,987 dozen cans, 34,274 dozen liquor and wine bottles, and 2,214 dozen wine jugs.

Cash is an integral factor in operating a bottle depot. "I go through a third of a million a year," said Gordon, who has operated a bottle depot seven years. "You need about $35,000 to $40,000 to run a depot."

He said it is difficult to estimate how much a bottle depot clears a year, since much of the money is tied up in stock like the shells, for which the operators pay a deposit to pop companies, and a steady cash flow is needed to run the business.

Wayne estimates Bonaventure cleared about $20,000 last year, but points out there are the usual expenses – house payments, car payments – and that neither he nor his wife draws a salary. The rent on his building has just gone up to $16,060 per month from $12,060.

Gordon does not pay rent; he owns his building, having bought the former drycleaning plant for $100,000. ☐

The 'Garbage-is-Garbage' Syndrome

If good brick could be made in Alberta by recycling a normally-wasted product, and sold for a fraction of the price of conventional brick, it would be a runaway success, right?

Wrong!

Not even if it kept undesirable effluents out of the air, took less energy to produce than conventional brick, and involved less in shipping costs than brick manufactured outside the province.

International Brick and Tile, of Wabamun, west of Edmonton, began in the late 1960s to study the possibility of producing brick and tile using fly-ash (essentially the clay component of coal) from the coal-fired Calgary Power plant on Lake Wabamun.

"A gentleman wanted to spend about a million dollars in a high-risk, high-return sort of investment which his children would benefit from several decades hence," recalls Jack Ondrack, International Brick and Tile's former president.

Looking at economic trends, it was apparent that the market for building materials was growing rapidly, as was the interest in anti-pollution. The two were combined in a process, developed at West Virginia University, to make brick largely from fly-ash.

In a coal-fired utility, after the coal is burned the fly-ash which is not separated out by costly precipitators goes up the smokestack and out into the atmosphere.

Although Calgary Power has since made great strides in precipitating out nearly all of its fly-ash, at the beginning of the decade whatever was not used by the brick company or in the production of concrete – about 30 per cent – was released into the air, said Ondrack. A Calgary Power spokesman said the figure was about 15 per cent.

Not only did the production of brick and tile from fly-ash use up potential air pollutants, it also saved land from having to be strip mined for clay.

"We spent the million dollars and then some in research and development, pilot testing and production of these products, and we got to the point where they met all the US, British and Canadian requirements in their respective categories for facing brick and quarry tile," said Ondrack.

But the project was a flop.

One major problem was that people did not want to buy brick or tiles made from secondary materials, said Ondrack. "So many architects told me they wanted the Frank Lloyd Wright 'dig-it-out-of-the-ground' feeling.

"They wanted natural materials in the same way you want natural wool, genuine leather, and so on." In addition, builders and architects were hesitant to use something new, he claimed, "especially if it was made from garbage."

The current manager of the company, Derek Gough, agrees that a "distinct factor" in the marketing failure was the preference of builders and architects for virgin materials.

People had a "garbage-is-garbage" attitude about the products, and "perhaps our sales people didn't work hard enough to convince people that this wasn't garbage," said Gough.

Ondrack stated, however, that nearly every architect in Alberta, Saskatchewan and British Columbia was aware of the products, and many of them also had samples.

Other factors in the failure could have been the limited quantity of colors, and perhaps some inefficiency in the manufacturing process, although Ondrack claimed: "It was efficient enough if the sales had been there."

One aspect which is not questioned, said Gough, is the quality of the brick and tile. Edmonton's Mayfield Inn is made of them, and the tiles were used in construction of the city's Muttart Conservatory.

Most telling of all, "the Queen will be walking on them" at Government House in Edmonton.

"We had a technical success but a marketing failure," said Ondrack, adding that the company found sales much better when the customer didn't know what the products were made of.

"However, unfortunately, we'd spent a fair amount of money advertising and telling the fly-ash story and too many architects now know that our tiles are made from secondary materials."

The brick and tile from fly-ash cost between 15 and 50 per cent less than conventional brick, depending on the type of conventional brick it was compared with.

The products were on the market from about 1971 to 1976, and now the company confines its operation to the production of pottery, including vases, ashtrays, ornaments and liners for slow-cookers.

International Brick and Tile, now owned by Great West Steel, will likely be sold in the near future, said Gough. He believes the public's attitude towards recycled materials has changed, and that, with the lower price of the tile and brick, "there's a better-than-even chance" the fly-ash operation will sometime be resumed.

What does the company's former president think?

"I don't know if the attitude towards garbage has changed," said Ondrack, "and I'm certainly not going to get into recycling again to find out." ☐

The Waste Paper Boom

Paper salvage dealers have to hussle to keep up with the burgeoning industrial demand for used paper

The paper these words are printed on has likely had more lives than the neighborhood tomcat. At different times, it may have been a computer card for a telephone call to Bogalusa, a Xerox copy of a billion-dollar deal or a letter signed by a president.

And it's quite possible that your living room walls, even the shingles on your roof, were made partly from that stack of newspapers you gave the Boy Scouts a few years ago.

It's all part of Alberta's paper recycling industry, which not only saves trees and energy but is becoming big business.

Paper accounts for about half the volume of solid waste collected by municipalities in North America. In Alberta, an estimated 464,000 tons (418,000 tonnes) of waste paper are generated each year: 93,000 tons 84,000 tonnes) of newspaper, 116,000 tons (104,000 tonnes) of corrugated medium such as cardboard box material, and 255,000 tons (230,000 tonnes) of mixed paper including magazines, business forms and beer cartons.

The great bulk of this wastepaper is thrown out with the trash and taken to landfill sites. But more and more is being gathered by community groups on fund-raising drives, by conservation minded (and dollar-conscious) institutions, and, thanks to a thriving building products industry, by paper salvage companies.

According to a spokesman in the environment department, about 50,000 tons (45,000 tonnes) of paper is recycled in the province annually including nearly 40 per cent of the available newsprint in some areas.

In rough approximation, 100 pounds (45 kg) of paper is a pile three feet (90 cm) high. A ton (0.9 tonne) is a pile of Edmonton Journals 60 feet (18 m) high, and 50,000 tons (45,000 tonnes) would stretch to nearly 915 kilometres – from Medicine Hat to Fort McMurray!

After steel, paper is the largest recycled item in the province. It's cheap, abundant, easy to work with – pulp is made, basically, by mixing paper with hot water – and in demand for the manufacturing of such products as shingles, gypsum papers, wallboard and insulation.

The "cycle" in paper recycling really begins at places like the University of Alberta, which expects to collect 600 tons (540 tonnes) of waste paper for recycling this year.

The university generates enough waste paper each year to cover a football field up to 14 feet (4.2 m) in height, says Werner Larsen, manager of the university's building services division.

His staff distributes two waste cans to everyone participating in the recycling program. One is for "pure" paper products – with no carbon, staples or other "impurities" attached – and the second for other waste, such as plastic, styrofoam cups and cigarette butts.

Building service staff routinely empty the non-paper waste, and, when the specially-labelled paper can is full, its owner himself takes a short walk and empties it into one of 350 larger bins located throughout the campus.

These bins are inspected daily, and, when full, they are taken to the building's loading area. From there, the paper is trucked to a small, prefabricated building on campus that serves as the university's paper depot.

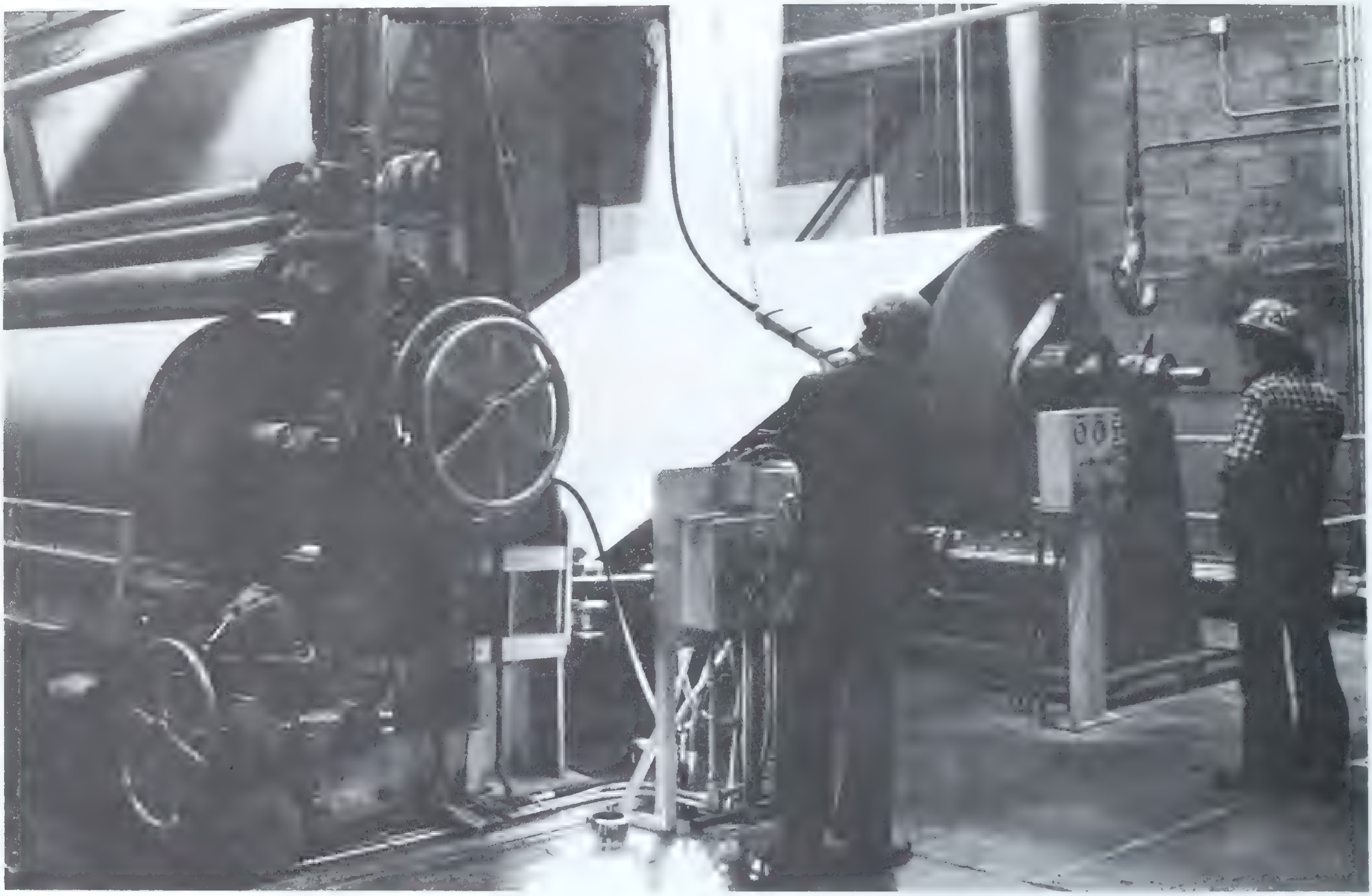
At the depot, paper is rough sorted and baled by one of two balers for delivery to a paper salvage company, saving, noted Larsen, 35 average-size trees every day.

It could be more – perhaps up to 125 trees. But, largely because of the attitude that handling waste paper is "janitors' work," the program works with about 30 per cent participation, said Larsen.

Does the university program, which took $35,000 to set up five years ago, make any money? "Let's put it this way," answered Larsen. "We don't lose any money."

Alberta Government Telephones collects between 150 and 200 tons (135–180 tonnes) of waste paper annually in a simpler collection program at the Alberta Telephone Tower in Edmonton, which brings AGT about $15,000 a year.

Only large volumes of high-quality paper – mostly from the computer section and from telephone operator units using toll cards – are collected. They are packed into shipping cartons in a room near the basement loading



dock, and picked up weekly by trucks from Paperecycle of Alberta.

The provincial government shreds and bales paper from all government departments at its records centre in Edmonton, sending three categories – mixed, computer printout and computer tab cards – to Paperecycle.

From April, 1977, when the program was begun, to the end of January, about 304 tons (274 tonnes) of paper had been recycled, said Ted Shepherd, manager of data storage and consulting.

A study in 1976 said the operation could be paid for in a year by the sale of the paper, but it will probably be a "break-even proposition" this year instead, said Shepherd.

The government is not only concerned with saving resources but also with the confidentiality of the government records to be destroyed, which is more readily ensured under the program that when the records had to be trucked away for incineration.

The provincial environment department has just begun a program to recycle white ledger paper from its offices, and expects to collect two to three tons a month.

Employees put the paper in desktop baskets, and, when they are full, dump it into a large box in each work area. A designated person in the work area takes the boxes, when full, to a storage room, and it is sold by the surplus sales division of Alberta government services. Revenues go into the government's general revenue fund.

Waste paper from the university, AGT, the government and many other sources – including about 200 fund-raising community groups – from Red Deer to the northern Alberta boundary goes to Paperecycle of Alberta, located just east of Edmonton.

Paperecycle pays $30 a ton (0.9 tonne) for waste newspaper delivered to its plant. Rates for other grades of paper range from $10 a ton for mixed paper to $90 a ton for computer tab cards.

Last year the company paid out about $280,000 to community groups on paper drives. Many Edmonton groups make over $1,800 a year, and the most successful drive raised $6,000.

Paperecycle has not made a profit in the past, says Gay Broderick, the firm's waste paper consultant. "It's not that we're losing money; we've expanded so we're spending more." But this year the company, whose new plant houses a baler capable of compressing sorted paper into a one-ton bale in three minutes, expects to show a profit.

"We're in a huge climb right now" due largely to the demand for newspaper for the production of cellulose insulation, she said. The average home has nearly two tons of waste paper in its construction, including insulation, wallboard and shingles.

Last year Paperecycle collected about 25,000 tons (22,500 tonnes) of paper, representing a saving of nearly half a million trees for future use. The figure also means a taxation saving of $425,000 in garbage disposal costs, calculated at $17 a ton (0.9 tonne).

Energy savings are also significant; studies have shown it takes 30 to 40 per cent less energy to produce paper

A forklift carries a one-ton bale of used paper into Building Products' plant to be transformed into rolls of gypsum paper, which line the driveway.

products from waste paper than to produce them from virgin pulp.

But ecology isn't the only reason – perhaps not even the major reason – for the steady upswing in paper recycling recently.

"I believe in recycling and conserving," said Broderick, "but you have to have the markets." And the markets are there, both foreign and domestic. This year about $200,000 worth of waste paper will be exported by the company to the United States, Japan and Korea.

In southern Alberta, the principal paper dealer is IG Paper Recycling, a division of IG Machine and Fibres Ltd. Manager Rick Slomka says the Calgary company collects about 20,000 tons (18,000 tonnes) of all grades of waste paper annually from its own depots, community groups and retail industries such as Safeway, which sends in its cardboard boxes.

Slomka agrees that the demand for used paper is increasing, but expresses concern, as did Broderick, for the traditional fluctuations in the waste paper market.

"The waste paper industry traditionally has had peaks and valleys," he said. "That's a very, very bad situation for the community psychology. If you can't take the paper a group collects (because there's no market for it), people won't collect again.

"We're attempting to use a stable price and work with consistent suppliers" such as retailers, who can deliver on a more reliable basis than volunteer groups on paper drives.

As with Paperecycle, IG Paper Recycling collects, sorts and bales paper in its plant, then exports some and sends most of the rest to be watered down for the production of building materials.

A new paper dealer in Calgary is Action Paper, which has only been in operation about six months. Its aim is to reach the residential volume of paper, chiefly newsprint, through community depots run by charitable organizations.

At present Action Paper receives about 180 tons (162 tonnes) of all grades of paper per month, sorts and bales it, then sends it to insulation manufacturers in Edmonton and Cranbrook, BC.

A spokesman said the company is working out plans to set up a pilot recycling system within a major oil company, and hopes to handle 500 tons (450 tonnes) a month by the end of the year.

Now, once the waste paper has been collected by various groups and baled by paper salvage companies, what actually happens to it?

Industry demand for waste paper is substantial and varied. In Edmonton, Building Products of Canada Ltd uses about 24,000 tons (21,600 tonnes) of recycled paper annually in the production of roofing felt (the base material for shingles), gypsum paper (put on the front and back of wallboard) and corrugating medium.

Celufibre Industries Ltd uses about 35 tons (31.5 tonnes) of used newsprint daily to produce cellulose insulation which it claims is inexpensive, fire retardant, non-toxic, and exceptionally high in insulating value. Canadian Cellulose and Insulation Ltd also manufacturers cellulose insulation, and TruRoc Gypsum Products Ltd pulps lower-quality waste paper for use as a strengthener in wallboard.

In Calgary, IKO Industries Ltd uses waste newsprint in the production of shingles and insulation board. IKO uses about 35 to 40 tons (31 to 36 tonnes) of corrugated paper, 12 tons (10.8 tonnes) of newsprint and six to eight tons (five to seven tonnes) of mixed paper, obtained from IG Paper Recycling, every day. The mixed and corrugated paper go into the production of roofing felt, and the newsprint is used as a filler in the

After being delivered to Paperecycle of Alberta, waste paper is taken by conveyor belt to a baler which compresses it into a one-ton bale in three minutes.

Paper is fed into a shredder at the University of Alberta's recycling depot, and carried on a conveyor belt to a baling machine.

board.

The largest user of waste paper in Alberta is Building Products, a subsidiary of Esso Chemical, which can manufacture enough shingles in an eight-hour shift to roof 120 houses.

Paperecycle makes daily deliveries to the plant, filling its yard with bale after bale of used paper. A row of bales composed solely of the bright cardboard from crushed beer cartons stretches, perhaps 15 feet (4.5 m) high, nearly across the wide yard. The cartons, along with other lower grade paper, will be used to make roofing felt.

In the company's paper mill, yesterday's news (or the byproducts of yesterday's business or pleasure) is dumped into vats like huge mixmasters where it is combined with water. The resultant porridge-like material is then screened to remove foreign objects, like staples, and further broken down.

Finally it goes to the paper forming machine, a wide belt running over a series of cylinders. The cylinders pick up the pulp material, which is mostly water, and deposit it in thin layers on the belt.

The paper is then passed through a whole series of cylinders to dry it, and rolled or passed on to the roofing process.

The roofing felt, a cardboard material accounting for 40 per cent of the company's paper production, is saturated with asphalt obtained from the Imperial Oil Strathcona Refinery, just across Highway 16A from Building Products. Finally the shingles' top is covered with a granular material, the bottom is dusted with talc, self-stick adhesive is added, and the shingles are cut and boxed.

Building Products makes two kinds of gypsum paper – ivory for the front side of wallboard, and gray for the back – as well as the corrugating medium.

Because of a large portion of Edmonton's waste paper goes to the landfill site rather than to the paper salvage operators, Celufibre Industries Ltd has to bring in carloads of the raw material from the United States and other western provinces.

Celufibre insulation is made entirely from recycled newsprint, with pulverized chemicals added as fire retardants. At a waste resources seminar in Edmonton last year, Celufibre's Tom McGee noted that it takes only 500,000 BTU's (528,000 kJ) a ton (0.9 tonne) to make cellulose insulation, compared with 12 million (12.6 million kJ) to make glass fibre insulation.

Celufibre insulation has the highest "R" value of any on the market, he noted; in other words, it is most resistant to the flow of heat escaping a building in winter, or entering in summer.

So insulation made from used paper not only takes less energy to make, it causes less energy to be consumed in the home or business.

From the consumer – to the paper salvage companies – to the building products industry – back to the consumer. The cycle has taken a full turn, and in its wake has left forests intact, energy conserved, a local supply of quality building products ensured.

A newspaper dumped into a trash can is on a dead-end trip. ☐

Oksana Scott

The Drayton Valley Project

In May, 1976, the town of Drayton Valley was the scene of an environmental experiment. For one year volunteer citizens would sort, wash and separate their household garbage. They would place their glass into galvanized tins marked "glass," metal into tins marked "metal," would bundle their newspapers, and then set all these out for collection once a month by the town's disposal crew.

And for one year, Alberta Environment and the town's council would record the rate of participation, the steps involved and the cost of the project. At the end of that experimental year, aided by the statistics which this recycling project was expected to provide, Alberta Environment hoped to know two things.

First, are Albertans willing to make recycling a part of their daily lives, and participate in a province-wide recycling process? Second, is manual sorting of garbage practical in terms of financial cost, administrative effort, and individual time and energy involved?

If the answer to both questions turned out to be yes, Alberta Environment could begin to tackle other stages in the recycling process. For example, they could seek out buyers or develop markets for our garbage, both in its raw and recycled forms.

It is now almost one year since this project tapered to a halt. The cost question remains unanswered, partly because the government hasn't been able to compile a detailed breakdown of the expenses involved, and also because the project was not planned and implemented as carefully as it could have been.

But the participation question – and it is probably the most important one – has been answered: No, we as citizens are not yet prepared to make recycling a part of our daily lives. How do we know this? Why aren't we prepared? And are there some things which we must do or some things which must happen before we are prepared? To answer these questions, let's look specifically at some aspects of the Drayton Valley project.

Drayton Valley, which lies about 142 kilometres southwest of Edmonton, was chosen for the experiment largely because of its proximity to Edmonton. Yet the town is probably representative of most communities in Alberta. It is a boom town – an oil town – and has a high standard of living and no obvious pollution problems. Its citizens are like most Albertans: They work hard, earn good salaries and enjoy a reasonably affluent life. They also act in accordance with that affluence when it comes to their garbage – they would prefer not to be bothered with it and would like to dispose of it in the quickest and easiest way possible.

In view of this, it is not surprising that they responded with hesitation when "let's save" leaflets requesting their participation in the recycling project arrived at their doors. Phone calls to the project's office trickled in slowly until approximately 140 residents had registered.

This town of 4,500 has approximately 1,400 living units, which shows that about ten per cent of the households had decided to join in. Generally speaking, ten per cent response is what we can normally expect in any study. It can reveal the information we are seeking, and it could have provided Alberta Environment with the cost information needed. These households showed initial enthusiasm. However, participation gradually dropped, and in April 1977, at the end of the experimental year, the project was terminated.

Why hadn't Drayton Valley residents eagerly snatched up this opportunity and turned it into a long-term, successful community venture? Several people who were actively involved in this experiment have some answers.

One such person is Rob Pritchard of Alberta Environment's waste management branch. He was a key initiator of the project and thinks that some of the difficulties can be traced to the fact that the project was initiated outside the community. As a result, some residents viewed the project with skepticism and saw it as possibly being government "busy work" or "wasting taxpayers' money."

Nevis LaBranche, a town councillor at the time of the project, thinks that involvement of clubs and community groups would have helped. She feels that when people see some personal gain to themselves or to some youth group in their community, they are more likely to participate. A few groups, and all the schools, were approached with a request for support, and at one point the Cub Scouts took over the collection of newspapers. But this did not seem to be enough. The citizens just did not see any concrete reasons for their bother and did not anticipate any direct reward for their effort.

What kind of reward would have helped? "People would do it for money," LaBranche commented, giving the example that if certain garbage is burned to heat the community, people see this as an economic benefit for their effort. LaBranche also suggested that setting up a company – a business that would treat such a project as a commercial venture – would help. In fact, she added, town council had discussed the possibility of encouraging private enterprise but had quickly recognized that the lack of buyers and markets for the garbage would present a problem.

It is likely that the project could have been advertised more effectively. At the beginning of the experiment, residents received leaflets describing the project, its purpose, the steps involved, and how to register as a participant. A calendar showing the days on which each type of garbage would be collected was also enclosed. At the same time, full-page ads appeared in the two local newspapers.

However Manohar Deol, the town engineer, wonders whether this was enough. He thinks that one has to continue reminding and reinforcing people throughout the project. Deol also suggested that offering a prize to the person who turns in the greatest amount of garbage may act as an incentive to citizens.

What about the appeal of the advertisements? Could this have been improved? Pritchard thinks so. He thinks the ads were quite dry and contained almost too much information; that they could have been lighter in content and had more "zing."

And the message of the ads? LaBranche read the ads as extending a plea for cooperation, with the underlying message being one of environmental concern. This is a central message in recycling. Yet if people tend to read ads with the question "What's in it for me?" in their minds, perhaps ads which also answer this question will attract more readership and response.

The individual time and energy required of each citizen is an important factor in any activity. Whereas some individuals commented that not wanting to bother was a reason for low participation in the Drayton Valley project, they also saw the time factor from the point of view of the householder.

For example, Deol thought that people don't always have the time to get involved; that when both husband and wife work, they don't have time to cut the grass, let alone sort and wash garbage. LaBranche added that a homemaker with three or four children simply can't accommodate additional tasks, and suggested that a central mechanical sorter would probably be the best solution. Such sorters are being successfully used in some communities. However, they are expensive to purchase and operate. It is for this reason that Alberta Environment conducted the Drayton Valley experiment in manual sorting. If it turned out to be feasible, small communities which cannot afford an expensive sorter would have had a proven alternative.

Alan Dick, a biology teacher in the town's high school, wonders if perhaps recycling projects won't work until the environmental problem affects the person directly.

"I think it would almost have to be forced on them," adds LaBranche, explaining that circumstances such as a worsening economy and diminishing supplies of goods may force people to conserve and recycle.

What else would help? Dick thinks that standardization of all containers would orient people toward recycling, in the same way that reusable pop and beer bottles encourage us to return these containers.

Dick also summarized another key problem of the Drayton Valley project: "People just didn't know why

they were doing it." In expressing a similar opinion, Pritchard added that people do not yet connect the issues of pollution and recycling in their minds. For example, they may see how dumping garbage into a lake creates a polluted water supply, yet do not see how buried garbage may, in ten or 20 years, affect the purity of their water supply. This seems to suggest that our present attitudes and level of awareness form the real core of the recycling issue. That, in living in a "throw-away society," we find it difficult to be conservation-conscious. So what can we do about it? How can we change our awareness?

By education. All the interviewed participants felt that it is through our schools that we can begin to shape new attitudes and behaviours. Parental example is also important, suggested Dick, for although "it's got to come from the youth . . . kids will do what their parents do."

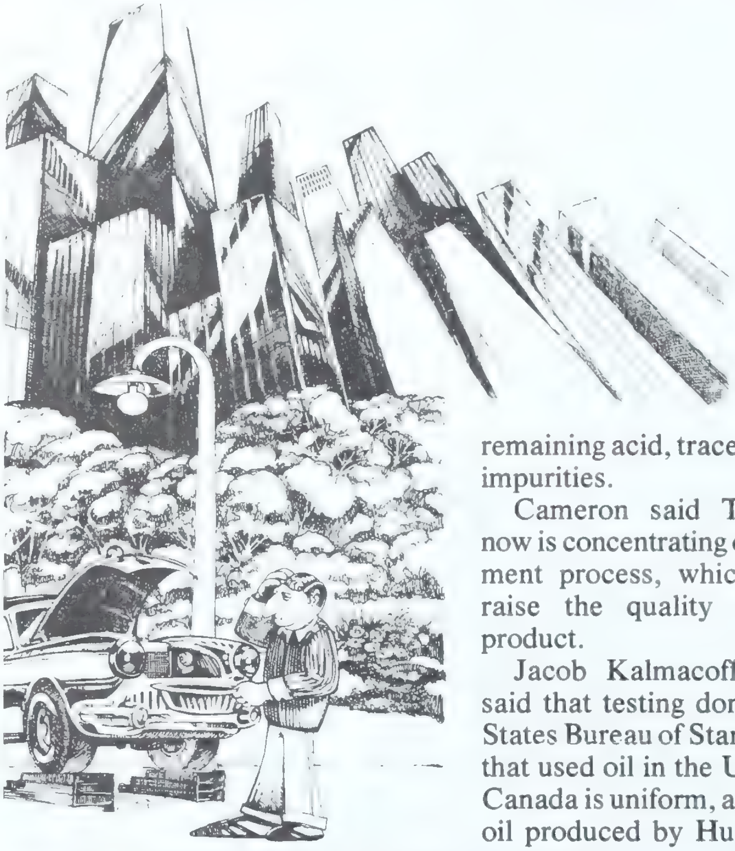
This suggests cooperation between government, industry, schools, communities, families and individuals. If the attitudes and acts of each one of these units influences the attitudes and acts of the others, there is a need to work together and exchange ideas. According to the individuals interviewed, the Drayton Valley project was not really discussed by the people.

The comment is frequently expressed that, when it comes to environmental issues, people "are too lazy" or "just don't care." Perhaps . . . yet perhaps the Drayton Valley project has shown us that people "act lazy" for a reason. We need to understand why we are doing something. We need to see some kind of personal gain in that activity. And we need to be encouraged, rewarded, and even prodded by those who understand the purpose better than we do.

So, in summarizing the findings of this experiment, we see that although the Drayton Valley project was not successful as a cost study, it did provide explanations as to why we are not prepared to recycle, and how, perhaps, we can become prepared: through education, example and dialogue.

Once these occur, perhaps the method we choose to solve our problem will evolve naturally; perhaps we will then view the personal and administrative costs involved as very reasonable, and a worthwhile investment toward the quality of life we desire. □

Oil Re-Refining



As winter slowly fades into spring, many motorists begin thinking about changing the oil in their cars. Those who do it themselves are confronted again with the problem of what to do with the old oil when they're finished.

A 1974 study showed that most urbanites – about 64 per cent – and virtually all rural dwellers simply dump their waste oil on the ground.

But there is another alternative, one that not only lessens pollution but conserves energy supplies and results in a marketable product.

Two Alberta firms, Turbo Refineries Ltd and Hub Oil Co Ltd, are recycling large quantities of oil for use by railways and automobiles, respectively.

Turbo re-refines about 1.5 million gallons (5.7 million litres) a year from CP Rail, CN Rail and city service stations, returning it to the railroads for use as a lubricating oil in diesel locomotives and as "journal box" oil to lubricate bearings on railway car wheels.

Hub Oil collects about a million gallons (3.8 million litres) a year from service stations and industrial sources throughout southern Alberta, producing a crankcase oil called "Lubie Lube" which sells about half a million gallons (1.9 million litres) a year through independent service stations and grocery stores from Winnipeg to Vancouver.

According to the 1974 study by the Calgary consultants Synergy West Ltd, funded by the Alberta environment department, the Alberta environmental research trust and Turbo Refineries, it is conceivable that re-refined oil has better lubricating properties than oil refined directly from crude oil.

"It has endured several thousand miles of engine operation," says a summary of the study's findings, "with the engine acting as sort of a refinery, burning off inferior hydrocarbon molecules. Re-refined oils, mixed with appropriate additives, have been increasingly recognized as being on a par with virgin oils."

Doug Cameron, technical manager of Turbo, said oil refined by the acid/clay process is darker in color, has a different odor and slightly less oxidation stability than the highest quality of crude-based oil available.

"It's almost as good," he said, and the cost savings (it costs about 10 per cent less than crude-based oils) "give it the edge."

A US consultant has determined that re-refining oil saves 20,000 BTU's (21,000 kJ) – the equivalent to the heat produced by 20 cubic feet of natural gas (0.6 cubic metres) per gallon (3.8 litres) of lube oil, over the production of lube oil from crude oil.

Under the acid/clay process, which both Turbo and Hub presently use, oil is first heated to drive off water and light hydrocarbons, such as gasoline. The oil is then treated with sulphuric acid, which draws out major impurities. Final contact with clay removes remaining acid, trace metals and color impurities.

Cameron said Turbo's research now is concentrating on a new pretreatment process, which would further raise the quality of the finished product.

Jacob Kalmacoff, Hub's owner, said that testing done by the United States Bureau of Standards has shown that used oil in the United States and Canada is uniform, and that re-refined oil produced by Hub meets new car standards.

However, the oil is not warranty-approved (it cannot be used by new cars under warranty) because it is prohibitively expensive to get oil warranty-approved, said Kalmacoff. He noted that Lubie Lube costs about 50 per cent less than crude-based oils.

Cameron said Turbo, after re-refining oil with its new process, plans to have the warranty-approval tests conducted, and may eventually get into the production of automotive crankcase oil.

Kalmacoff and Cameron both noted that the US Congress has passed a law encouraging the recycling of used oil, although nothing comparable has been done in Canada.

The Synergy study estimated that about 19.5 million gallons (74 million litres) of lubricating oil were sold in Alberta in 1973, with 6.4 million gallons (24.3 million litres) sold in the six major cities. It was estimated that just over half the oil sold in the six centres was collected for re-refining.

"Both Turbo and Hub have increased their collection capability since 1973, so much of the oil that had been going to municipal landfill sites is now being refined," said Cameron.

However, the study said that for

Alberta as a whole, only about one-twentieth of the oil sold in 1974 was collected and refined. About one-fifth of the oil was burned during engine operation, and one-twentieth was used for dust suppression on rural roads. The rest, about three-fourths of the oil sold, entered the environment . . . "dumped indiscriminately on the ground, in the garbage, in sewers, and perhaps even in streams."

The Synergy investigation accounted for 7.5 million gallons (28.5 million litres), presently dumped, which could be collected and reused. It noted the amount of oil collected could be increased with the public's co-operation.

Besides re-refining, said Synergy, there are two other major uses for waste oil: fuel and road oiling.

In eastern Canada, where the price of fuel oil is high, fuel oil distributors have collected waste oil, treated it nominally to remove water and sediments, then blended it into No. 4 fuel oil and sold it as boiler fuel. In Alberta, however, the lower price of natural gas has made this unnecessary.

Waste oil is not an ideal fuel because it tends to corrode burners and foul boilers faster than regular fuel oil.

Synergy said at least 311,000 gallons (1.2 million litres) of waste oil were sprayed on roads by Alberta municipalities – the provincial highways department has been discouraging it – and 1.4 million gallons (5.3 million litres) were used for road oilings in rural areas of Alberta, mostly by individual farmers.

However, it said the use of waste oil on gravel roads was inefficient in retarding dust, and should be prohibited until environmental effects can be determined. Clearly, the report felt, re-refining is the best route for used oil.

The study isolated a number of factors which it said were impediments to the recycling of oil. The cost of re-refining has risen as lubricating oils have become increasingly complex, it said.

New car warranties, stipulating the use of virgin oil, have implied that used oil is inferior in quality; there generally hasn't been enough information provided to the public on the quality of re-refined oil.

In addition, explained the study, Canada's tax structure hasn't favored the re-refining industry. For example, while no sales tax is applied to re-refined oil for the railroads, as long as the oil is returned to the original user, there is a sales tax on journal box oil re-refined from used automotive oils and sold to another user. "This tax and the original manufacturer's tax on virgin oil means essentially that the same material is taxed twice."

In its conclusions, Synergy said its survey indicated widespread collection of used oil would be feasible and economic if large quantities of oil could be ensured.

It recommended that a comprehensive collection program for re-refining oil be begun in the six communities studied – Edmonton, Calgary, Lethbridge, Grande Prairie, Red Deer and Medicine Hat – and suggested supportive measures by the federal and provincial governments.

The Alberta government could help foster the acceptance of re-refined oil by requiring its use in government vehicles, and could offer low-cost loans or subsidies to the re-refining industry.

The conventional acid/clay process is outmoded, because of high production costs and problems with disposing of sludge byproducts, so re-refiners in Alberta should convert to a more efficient and less waste-producing process, recommended the study.

The Alberta government has begun offering grants to municipalities for the construction of storage tanks to hold oil for re-refining.

What can individuals do with the oil they drain from the crankcases of their cars? Cameron, at a waste resources seminar in Edmonton last spring, suggested they dump small quantities at their local service station.

"All stations in Edmonton and Calgary have storage facilities for waste oil and they have them pumped out free of charge (by the re-refiners) when required." ☐

The Scrap Metal Cycle

All too often, it ends in the dump

Old refrigerators, washing machines, tin food cans and car bodies – these are among the great under-recycled metal products in Alberta today.

The big problem with these items, and others like them, is that they are made from a combination of metals, which can't be as easily reclaimed as glass is from old bottles or pulp from waste paper.

An average refrigerator has 260 pounds (117 kg) of steel in it – but also 12 pounds (5.4 kg) of copper and brass, and nine pounds (4.05 kg) of aluminum. A "tin" can is actually about 86 per cent steel, ten per cent aluminum, and less than half a percent tin. Steel car bodies are laden with chrome, plastic and glass.

The separation facilities necessary for recycling these metals don't, with few exceptions, exist in Alberta. There is only one "hammer mill" capable of grinding up old cars, and the pieces of steel still have bits of other materials attached. There are no de-tinning plants for cans, and apparently no municipality has a system for separating out, and marketing, the old appliances dumped in its landfill sites.

According to a March, 1977, study prepared for the provincial environment department's waste management branch by Beak Consultants Ltd of Calgary, an estimated 57,000 tons (51,300 tonnes) of automotive scrap are generated in Alberta each year.

Out of this, said the study, only about 22,500 tons (20,250 tonnes) were being processed, 60 per cent through the Calgary hammer mill, Navaho Metals, and the remaining 40 per cent through Interprovincial Steel and Pipe Corp Ltd (IPSCO) of Regina.

Harold McIlwain, Navaho's assistant manager, says that last year the company shredded close to 20,000 tons (18,000 tonnes).

Navaho has a contract, acquired by bid, with the provincial government to squash derelict vehicles in municipal holding sites throughout the province, and haul them to Calgary for shredding. Navaho is also the official car disposal lot for the city of Calgary and a number of towns in the Calgary area.

But it also takes car bodies from private scrap dealers, and has been as far north as High Level, 782 kilometres northwest of Edmonton, with its mobile flattener.

After a crushed car body is unloaded at Navaho's plant in Calgary, it is dropped into the hammer mill and chewed up, in less than three minutes,

by 200-pound (90 kg) hammers mounted on a drum revolving at 850 revolutions per minute.

"Most of the pieces are the size of your hand or smaller," said McIlwain. "The largest chunk is as big as your head."

The paint flakes off, and the glass disintegrates, while an electromagnet seizes the steel and puts it on a conveyor belt leading to a truck. The paint and glass are taken to the landfill site along with the tires. The copper and other metals left behind are gathered and sold.

The mill has a capacity of 150 cars a day, although McIlwain said it usually handles fewer than that. Much time is taken maintaining the machines, but Navaho could still use more cars than it gets.

The steel is sold to Western Canada Steel in Calgary, which melts it down in the production of reinforcing steel for concrete structures.

In regard to appliances, the report estimated that there are 140,000 discards a year in Alberta, resulting in more than 12,600 tons (11,340 tonnes) of metal available for recycling. Limited numbers were being used by scrap metal dealers with shredding facilities, however "the recycling of appliances is not presently being undertaken to any great extent."

It suggested an appliance collection program be instituted, similar to the province's derelict automobile collection program, or that areas in landfills be set aside for large items. These areas could then be "mined" for various metals.

The consultants said nonferrous metals (those not containing iron) were hardly recycled at all in Alberta, although over $6 million worth of such metals – aluminum, lead, tin and copper – were dumped into landfill sites in Alberta every year.

"Obviously, these metals are not landfilled in bars of raw metal but are components of cans, appliances and other materials. Therefore, the feasibility of separating the metals . . . and the existence of a market for these metals . . . become important questions.

Tin usually occurs as the coating on steel cans, and must be removed by dipping the cans in a caustic solution, a process called detinning. The only detinning plant in Canada at present is in Hamilton, Ont.

Comparing the amount of tin available in Alberta to the amount necessary for a detinning plant to be feasible, the study said a detinning plant was technically and economically feasible in either Calgary or Edmonton. More information, however, should be gathered.

Why is the tin coating necessary on a steel can? Why can't cans be made of one metal, wherever possible, as the Beak report recommended?

Ralph Whittall, director of public affairs for Continental Group of Canada Ltd, which manufacturers "tin" cans, answered that, with the present method of manufacturing tin cans, you can't solder the side seams without the tin coating.

However, some cans are welded or glued together, and it is company policy to have all the tin removed from the "tin" food can by 1985, he said.

One big factor in this policy decision was the fact that a can with tin on it cost about 50 per cent more to make than one without tin, added Whittall.

But even with a uni-metal can, he

said, "you have to go through essentially as much to make a can from scrap metal as you do to make it from ore." And with the transportation costs of getting the cans to a manufacturing plant, it still might not be worth it, economically, to recycle food cans.

Then, of course, there are problems associated with collecting food cans. Would the public voluntarily sort, rinse and perhaps crush its cans? Or would a deposit be put on all metal containers like the deposit on beverage containers?

One alternative, said Whitall, would be municipal separation of garbage. Metal, paper, glass and whatever else could be sold would be sorted out, and the rest could be burned as fuel.

This idea has often been suggested (see story on Drayton Valley experiment)but is currently in practice nowhere in Alberta.

The Beak Report estimated a total possible metal recovery of more than 120,000 tons (108,000 tonnes) a year from Alberta's municipal solid waste. For Calgary and Edmonton alone, 83,500 tons (76,500 tonnes) were available, representing 70 per cent of the total available metal. The report recommended that an inventory be conducted of landfill sites to create "a solid waste map of Alberta for resource recovery."

The city of Edmonton has just concluded a study on the feasibility of separating ferrous metals from the city's domestic solid waste in transfer stations (the places garbage is taken and ground before being hauled to landfill sites).

Roy Neehall, solid waste project engineer for the city, says the study showed that markets for the metal "in the state we could separate it" are very limited.

The metal could possibly be sold to a steel mill in Calgary, but the amount of money the city would get for the metal would be about the same as transportation costs to Calgary, said Neehall.

The separation equipment to go in each transfer station (there are two such stations in Edmonton, with a third underway) would cost $350,000, and the fluctuating prices in the scrap industry make the income from the sale of the metal even more uncertain. Most steel companies, noted Neehall, work on short-term contracts, and to justify expenditures like $350,000 the city would need long-term assurances.

How much scrap steel do the steel companies use, and where do they get it?

The Steel Company of Canada Ltd (Stelco) uses 100 per cent scrap in its steel-making operations. About 15 per cent of this is "home scrap," waste generated in the steel-making process, and the other 85 per cent is purchased scrap.

Morris Wuetherick, senior treasury clerk for Stelco, said the company takes nearly all the pop cans from northern Alberta, although, since the cans contain several types of metal, they can only be used in small quantities to make the lower grades of steel.

About half its purchased scrap is industrial scrap, like steel that is left over from construction projects and collected by scrap dealers. The rest of it comes from the railroads – from rails, cars or bridges – with rails being the best quality scrap available.

Stelco takes no automotive scrap, although it is almost as good as rail scrap if it is shredded, said Wuetherick. Another of the Beak report's recommendations was for the establishment of a shredding facility in the Edmonton region.

In Calgary, Western Canada Steel uses about 750,000 tons (67,500 tonnes) of scrap annually, including the automotive scrap processed by Navaho, most of the pop cans from southern Alberta, and "anything else from railroad equipment to refrigerators."

"We don't like the pop cans," said Garth McGibney, divisional manager, "but there's terrific pressure to take them." The solder makes an "awful mess" in the steel furnaces, while the aluminum tops of pop cans "kill the heat."

Iron foundries, like Canron Ltd in Calgary, also use scrap steel. Canron uses about 1,500 tons (1,350 tonnes) a month in the production of sewer pipe.

Two more obstacles to the recycling of scrap metal, as noted by the Beak report, are freight rates creating an economic preference for virgin ore over scrap in steel making, and taxation policies reinforcing this preference.

The scrap industry is classified as a retail trade industry for corporate income tax purposes. The suppliers of virgin ore are classified as extraction industries, and thus qualify for the federal depletion allowance that is roughly equal to 25 per cent of its resource profits.

"Thus, for every before-tax dollar the scrap dealer realizes 53 cents. By comparison the supplier of virgin ore realizes 64.8 cents." ☐

Recycling

Where to go in Alberta

If you've resolved to slim down those garbage bags and make formerly-wasted household materials available for recycling, here are some of the places that will take them off your hands.

Waste Paper (newspaper, cardboard, magazines, etc.)

NORTHERN ALBERTA
For information on depots or community groups collecting paper which are not listed here, contact
Paperecycle of Alberta
2015 87 Avenue
Sherwood Industrial Estate
Sherwood Park, Alberta
Telephone (403) 464 3131

SOUTHERN ALBERTA
For centres not listed below, contact either
IG Paper Recycling
4300 15th Street SE
Calgary, Alberta
Telephone (403) 265 2128

or

Action Paper
905 15th Street SW
Calgary, Alberta
Telephone (403) 261 9644

EDMONTON
Paperecycle has 24 permanent depots. See telephone number above.
CALGARY
Confederation Park Senior Citizens Centre
1320 21st Avenue NW

The Vocational and Rehabilitation Research Institute
3303 33rd Street NW

YMCA, South Branch
Heritage Drive and Haddon Road SW

RED DEER
Lindsay Thurber High School
4204 58th Street

FORT McMURRAY
McMurray United Conservation Corps
Between the old town office and the Bank of Commerce

LETHBRIDGE
Rehabilitation Society
1108 1st Avenue South
Telephone 329 3911

Soft Drink, Wine, Beer, Liquor Containers

There are about 170 depots located throughout the province. Look in the Yellow Pages of the telephone book under Container Depots or Breweries or Bottle and Can Recycling Depots. The depots in the centres listed below could not be found in the Yellow Pages.

LETHBRIDGE
Rehabilitation Society
1108 1st Avenue South
Telephone 329 3911

FORT McMURRAY
Northern Alberta Dairy Pool Bottle Depot
7413 Railway Avenue

Fort McMurray Bottle Depot
NTR Yard
8200 Block, Manning Avenue

GRANDE PRAIRIE
Borstad Cartage Ltd
9807 97 Avenue

Grande Prairie Beverages
9902 109 Avenue

Northern Bottling
10014 102 Street

PEACE RIVER
Borstad Cartage Ltd
Telephone 624 2862

Glass Jars

EDMONTON
Contain-A-Way Ltd
6018 83 Street
Telephone 465 0621

STOP Depot
9750 74th Avenue

CALGARY
Contain-A-Way Ltd
1324 44th Avenue NE
Telephone 277-8591

LETHBRIDGE
Contain-A-Way Ltd
3103 6th Avenue North
Telephone 328-7169

MEDICINE HAT
Domglas Ltd
Main Street North
Redcliff, Alberta
Telephone 548 3901

Metal

Look in the Yellow Pages under Scrap Metals. There is a limited demand for "tin" cans, such as food cans, because the tin is a problem in the steel-making process. However, some scrap dealers may accept a limited quantity. One known organization which takes tin cans is listed below.

EDMONTON
STOP Depot
9750 74th Avenue

Oil

Check with your neighborhood service station. Most have underground storage tanks for waste oil, which are pumped out by oil re-refiners. Otherwise, for location of a depot, contact one of the following firms.

EDMONTON
Turbo Refineries Ltd
PO Box 5827, Station L
Edmonton T6C 4G3
Attn: Leo Hedberg
Telephone (403) 466 2114

CALGARY
Hub Oil Co Ltd
5805 17th Avenue SE
Calgary, Alberta
(403) 272 3954

Rags, Old Fabric, Old Blankets

EDMONTON
Regent Distributing Co Ltd
7033 Girard Road
Telephone (403) 466 7265

Jack's Blanket Sales
10650 95 Street
Telephone (403) 424 5745

Recycling Film

A film on recycling in Alberta, entitled "Next Time Around," is now available, free of charge, for viewing by interested groups.

The 20-minute, color film, sponsored by Alberta Environment and five private companies involved in recycling, is available to educators through local school boards or the education department's lending libraries. Other groups can obtain it through the provincial film library.

If undelivered, return to:

Environment Views
Alberta Environment
9820 106 Street
Edmonton, Alberta T5K 2J6

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OTTAWA ONTARIO
ATTN: GOV'T DOCUMENTS K1A 0N4